Tough Constructions and their Derivation

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Abstract

This article addresses the syntax of the notorious *tough*(-movement) construction (TC) in English. TCs exhibit a range of apparently contradictory empirical properties suggesting that their derivation involves the application of both A-movement and A′-movement operations. Given that within previous Principles and Parameters models TCs have remained "unexplained and in principle unexplainable" (Holmberg 2000: 839) due to incompatibility with constraints on θ-assignment, locality, and Case, this article argues that the phase-based implementation of the Minimalist program (Chomsky 2000, 2001, 2004) permits a reanalysis of null *wh*-operators capable of circumventing the previous theoretical difficulties. Essentially, *tough*-movement consists of A-moving a constituent out of a "complex" null operator which has already undergone A′-movement, a "smuggling" construction in the terms of Collins (2005a,b).

Keywords: *tough*-movement, null operators, A-bar movement, raising, phases

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1 Introduction

Since the early days of generative syntax (e.g. Chomsky 1964, Miller and Chomsky 1963, Lees 1960), *tough* constructions[1] (henceforth TCs) have posed considerable theoretical difficulty. Despite the advances that the field has seen in nearly 50 years, a satisfactory syntactic analysis of sentences such as (1a) remains elusive.

(1) a. Linguists are tough to please.
b. These flowers are pretty to look at.

The TC configuration is characterized by an apparently "missing" object in the embedded infinitival clause, obligatorily interpreted as coreferent with the matrix subject. The particular difficulty encountered with *tough*-movement (TM) is highlighted by a comparison with the superficially similar *pretty* construction in (1b). Despite the appearance of both *tough*-predicates and *pretty*-predicates in complement object deletion (COD) configurations as in (1), sentences of the type in (2) and (3)—which I term *non-TCs*—are commonly adduced in support of the view that *tough*-class predicates exhibit different thematic behavior from other predicates triggering COD.

(2) a. It is tough to please linguists.
b. * It is pretty to look at these flowers.

(3) a. To please linguists is tough.
b. * To look at these flowers is pretty.

The conclusion traditionally drawn is that *tough*-predicates assign no "external" θ-role, the TC subject's θ-role being assigned by the embedded infinitival verb. This intuition underlies Rosenbaum's (1967) seminal analysis of TM as a rule of object-to-subject raising, essentially an A-movement operation. However, Chomsky (1977) provides convincing empirical support for an account of TM based instead on A′-movement of a phonologically null *wh*-operator, as in (4).

(4) John$_i$ is tough [$_{\text{CP}}$ Op$_i$ [$_{\text{TP}}$ PRO to please t$_i$]]

Although the evidence for A′-movement appears compelling (based on sensitivity to island effects and the licensing of parasitic gaps, for example), the approach whereby the TC subject (*John*) is base-generated in situ apparently leaves it without a θ-role, in vio-

lation of canonical theories of θ-role assignment. In light of various empirical and theoretical inadequacies of both A-movement-only and A′-movement-only analyses of TM, a common intuition of more recent P&P approaches is that TM must incorporate both A-movement and A′-movement operations. However, we see below that even implementations of the combined A- and A′-movement approach also encounter difficulties with at least one of the core theoretical concepts of Case, locality constraints, and θ-assignment.

This article proposes an analysis of the syntax of TCs within the Minimalist framework developed in Chomsky 1993, 1995, adopting the more recent extensions of the framework advanced in Chomsky 2000, 2001, 2004. We will see that recent theoretical developments concerning phase-based derivation, standardized "probe-goal" feature-checking configurations, and the formalization of the relationship between Case-assignment and ϕ-feature agreement present fresh possibilities for a combined A- and A′-movement analysis. Building on Hornstein 2001, I propose that the TC subject enters the derivation embedded within a complex null *wh*-operator which "smuggles" it via A′-movement into [Spec, CP] of the complement clause, a position from which it then is capable of undergoing A-movement into matrix subject position.

The article is organized as follows. Section 2 confirms the traditional intuition that *tough*-predicates do not assign an external θ-role, unlike *pretty*-predicates. Section 3 highlights the incompatibility of each analysis with core theoretical assumptions, briefly outlining and evaluating previous analyses of TCs. Section 4 develops a reanalysis of the null *wh*-operator, and examines how the feature specification and internal structure of a "complex" null operator permit a derivation of TCs consistent with Minimalist treatments of Case and locality. Section 5 outlines an extension of this analysis in order to provide an account for *pretty* constructions (e.g. (1b)), which, in turn, is argued to offer new insight into the syntactic function of null operators.

2 *Tough*-Predicates and their Arguments

Predicates that enter into TC configurations are typically adjectival (*tough*, *simple*, *impossible*, *hard*) or nominal (*a bitch*, and *a cinch*).[2] As first noticed by Lees (1960), and discussed further by Akatsuka (1979), Chung and Gamon (1996), Nanni (1978), there exists a sub-class of *tough*-predicates that cannot be placed on the *easy*/*difficult* scale but which may nevertheless be considered *tough*-predicates due to their appearance in the same range of syntactic environments as *tough*, *easy*, and so on:

(5) a. To watch Lloyd-Webber's hit musicals is annoying/unpleasant/fun.
b. It is annoying/unpleasant/fun to watch Lloyd-Webber's hit musicals.
c. Lloyd-Webber's hit musicals are annoying/unpleasant/fun to watch.

While this sub-class of *tough*-predicates undoubtedly merits further discussion, I do not pursue further the particular semantic characteristics of *tough*-predicates here. Crucially, following Chomsky (1981), Mulder and den Dikken (1992), among others, I do not classify predicates such as *pretty* and *handsome* as *tough*-predicates (despite their appearance in COD configurations) precisely because they cannot occur in non-TC environments (see (2b), (3b)).

This approach clearly envisages a single lexical argument structure of *tough*-predicates in order to account for both TC and non-TC configurations: as Aniya (1998) observes, an advantage of canonical P&P accounts of TM over lexically-based analyses is that they permit a simplification of the lexicon. This view, however, is widely contested; evidence against a single lexical argument structure for *tough*-predicates has typically been sought in the literature from two perspectives, discussed below.

2.1 Infinitival Omission

If the TC subject relies on the infinitival verb to assign its θ-role then this verb must always be structurally present. It is well documented that the infinitival clause may often in fact be omitted in TCs:

(6) a. This problem is difficult.
b. This problem is difficult to solve.

Such sentences lead Hornstein (2001), Kim (1995), Wilder (1991), and Williams (1983, 2003) to assume that in the absence of any predicate in an embedded clause that could assign the TC subject's θ-role, it must be assigned by the *tough*-predicate. Such an approach requires that whenever the infinitival clause in TCs does appear, it must be an adjunct, since it can be freely omitted without inducing a grammaticality violation.

It is often overlooked that across a wider range of TCs, infinitival omission is not consistently applicable. The examples in which the infinitival is not phonologically present are in fact restricted to cases where the linguistic context (as in (7)) or extralin-

guistic context (as in (6a),(8)) is rich enough for the meaning of the omitted clause to be retrieved.

(7) This article will be easy for Owain to translate into Welsh but difficult for Gareth (to translate into Welsh).

(8) Today's opposition will be difficult (to beat).

Following observations of Comrie and Matthews (1990), wherever the meaning of the omitted infinitival clause cannot be retrieved from the preceding discourse, the acceptability of the TC relies on some salient typical characteristic of the entity denoted by the TC subject. Accordingly, (6a) can freely paraphrase (6b) but not (9), since problems are typically something that one tries to solve, not (necessarily or automatically) to understand the significance of.

(9) This problem is difficult to get any idea of the true significance of.

It follows that in the absence of appropriate preceding linguistic context, a TC subject whose referent possesses no such salient typical characteristic will not permit omission of the infinitival, as Comrie and Matthews observe:

(10) a. *? That the election was a sham would be difficult.

b. That the election was a sham would be difficult for anyone to deny.

It appears, then, that the possible omission of the infinitival depends on its contextual recoverability, more reminiscent of argument omission than that of an adjunct.

Dowty (1982) points out that unlike an adjunct, if a syntactic argument is unrealized, then its meaning will remain implicit in the sentence. Indeed, Akatsuka (1979:6) argues that easiness and difficulty (etc.) obligatorily involve "agentive experiences," which correspond to the content of the infinitival clause, whether overtly realized or not. Returning to (6a), a problem cannot be inherently difficult; it can only be understood as difficult with reference to the conditions of its resolution for a particular individual or individuals, for example.

2.2 Semantic Differences between TCs and non-TCs

The second variety of evidence adduced against a single lexical argument structure for *tough*-predicates is that systematic semantic differences appear to obtain between TCs and non-TCs. Bayer (1990), Grover (1995), Kim (1995) and Schachter (1981) report that TCs give rise to a salient reading whereby some property of the TC subject is interpreted as being responsible for the difficulty or easiness. Thus it is suggested that in (11a) but not (11b) the most salient ("responsibility" or "causativity") reading attributes the difficulty experienced to some property of the mountain, such as the terrain or gradient:

(11) a. This mountain is difficult to walk up.
b. It is difficult to walk up this mountain.

As causativity is commonly considered to be syntactically encoded, Kim (1995) claims that *tough*-predicates differ in TC and non-TC sentences with respect to which constituents are assigned which θ-roles. Under her analysis, in non-TCs a cause θ-role is assigned to the infinitival clause. In TC configurations, however, the cause θ-role is assigned not to the infinitival clause, but to the TC subject; the infinitival clause is considered an adjunct in the TC.

Goh (2000b), however, provides detailed empirical evidence that this responsibility reading cannot be attributed to a difference in θ-role assignment in TCs and non-TCs. Goh demonstrates that the causativity reading in TCs is restricted and weak: it can be very easily cancelled by additional contextual information. In (12), for example, the reason for the difficulty is not the mountain itself but the inappropriate shoes of the climber:

(12) Even the smallest mountain is difficult to walk up while wearing stilettos.

Furthermore, as Goh shows, in many contexts the TC configuration is unable to give rise to a causative interpretation. Where the TC subject is propositional, for example, as in (13a), there can be no conceivable interpretive difference from the equivalent non-TC (13b).

(13) a. That Gareth didn't visit once in seven years is hard to believe.
b. It is hard to believe that Gareth didn't visit once in seven years.

Similarly, Goh (2000a) highlights that although idiom chunks such as *the hatchet* in (14) cannot by their very nature be ascribed responsibility, they may appear as TC subjects.[3]

(14) The hatchet is hard to bury after long years of war. (Berman 1973)

Goh's (2000a, 2000b) conclusion, which I find persuasive, is that the interpretive differences between TCs and non-TCs are best attributed to pragmatic rather than thematic differences. This coincides with Pulman's (1993) suggestion that TM is associated with a focussing effect, and Soames and Perlmutter's (1979:501) claim that the difference between TCs and non-TCs is simply one of "focus and emphasis." It seems that this is simply a tendency, however, since (14) for example does not necessarily appear to differ in focus from the corresponding non-TC.

Evidence from the optionality of the infinitival in fact indicates that omission of this clause bears closer similarity to argument omission than to adjunct omission. As the infinitival uncontroversially has argument status in non-TCs, there is no reason to suggest that it should not also be an argument of the *tough*-predicate in TCs. The evidence outlined above does not lead us to reject the null hypothesis of a single lexical argument structure for *tough*-predicates, and I henceforth assume (with Chomsky (1981), Browning (1987), Pesetsky (1987), Comrie and Matthews (1990), Brody (1993), and others) that *tough*-predicates do not assign a θ-role to the TC subject. I follow Pesetsky's (1987) conclusion that TCs with omitted infinitival clauses simply involve phonological deletion of a clausal argument that is syntactically present, and whose main verb can therefore assign a θ-role to the TC subject.

Before concluding this section, it should be noted that *tough*-predicates also assign a θ-role to an apparently optional experiencer within a *for*-phrase:

(15) a. Linguists are difficult (for philosophers) to please.
b. It is difficult (for philosophers) to please linguists.
c. To please linguists is difficult (for philosophers).

It seems reasonable to suppose that when no *for*-phrase occurs overtly the experiencer is structurally present and interpreted as arbitrary or implicit, as suggested by Berman and Szamosi (1972) and Epstein (1984).

3 Theoretical context

The independently-motivated assumptions concerning the lexical argument structure of *tough*-predicates, coupled with the theoretical framework adopted substantially reduce the range of syntactic analyses available for TCs. In this section we examine the direction that prevailing intuition has taken and identify the pitfalls of previous analyses, highlighting that each major approach raises quite fundamental theoretical objections.[4]

3.1 Previous Approaches to *Tough*-Movement

A transformational rule of *tough*–movement was first devised by Rosenbaum (1967) (and elaborated by Postal (1971)) in order to derive TCs and non-TCs from a single Deep-Structure representation, such as (16a).

(16) a. [to believe him] is difficult
b. it is difficult [to believe him]
c. he$_i$ is difficult [to believe t$_i$]

Extraposition applies to (16a), resulting in the insertion of *it* into matrix subject position, yielding (16b); *tough*-movement then applies to (16b), raising the object of the embedded clause into matrix subject position, replacing the expletive *it*. Though generative syntax has long since dispensed with such construction-specific transformational rules, it is not difficult to envisage an updated raising-based analysis whereby the TC subject receives its θ-role in the usual *v*P-internal configuration within the embedded clause and raises into matrix subject position. Indeed, this approach is appealing given the conclusion from section 2 that *tough*-predicates do not assign an external θ-role, and Bayer's (1990) observation that *tough*-predicates and raising predicates share various empirical properties.

Prima facie, patterns of nominalization also appear to support a raising analysis for TCs. It has been well known since Miller and Chomsky 1963 that the unacceptable nominalization of *tough*-predicates mirrors that of raising predicates; more explicit comparisons are made in Chomsky 1970.

(17) a. * John's easiness/difficulty to please.
b. * John's certainty/liklihood to win the prize.

c. John's eagerness to please. (Chomsky 1970)

However, it is perhaps premature to draw the conclusion that this similarity is somehow related to the application of raising. Note that nominalizations of *pretty*-predicates are also unacceptable, yet unlike *tough*-predicates, *pretty*-predicates clearly must assign an external θ-role:

(18) * The flower's prettiness/beauty to look at.

From a theoretical perspective too, a simple reduction of TM to A-movement is unsuccessful. Firstly, if the TC subject moves from the embedded object position, it should not, by assumption, be able to escape accusative case-assignment (which it clearly must since it instead receives nominative case later in the derivation). Secondly, TM would be a highly exceptional variety of A-movement in that it is capable of crossing a subject position (the subject of the infinitival clause, PRO). So while the A-movement analysis of TM appears consistent with the thematic properties of *tough*-predicates, it is incompatible with two core assumptions of P&P models, namely Case theory and locality constraints on A-movement.

Both matters are overcome by the null operator analysis of Chomsky (1977) (building on an approach by Lasnik and Fiengo (1974)):

(19) John$_i$ is easy [$_{\text{CP}}$ Op$_i$ [$_{\text{TP}}$ PRO to please t$_i$]]

The TC subject is base-generated in situ and receives nominative case. The object of the verb in the embedded infinitival clause is a null *wh*-operator (presumably assigned accusative case). Like overt *wh*-phrases, the null operator is required to undergo successive-cyclic movement to a [Spec, CP] position, but unlike A-movement, A′-movement is typically capable of crossing subjects. The evidence for *wh*-movement in the TC infinitival is compelling.First, extraction from the TC infinitival yields the type of locality effects typically observed in overt *wh*-movement environments:

(20) a. * What sonatas is this violin easy to play on?

b. * [$_{\text{CP}}$ what sonatas$_i$ is [$_{\text{TP}}$ this violin$_j$ [$_{\text{AP}}$ easy [$_{\text{CP}}$ Op$_j$ [$_{\text{TP}}$ PRO to play t$_i$ on t$_j$]]]]] (based on Chomsky 1977)

The ungrammaticality attested in the TC (20) arises since the [Spec, CP] position in the embedded infinitival clause is filled by the moved null operator, and hence cannot

be targeted by the overt *wh*-phrase en route to matrix [Spec, CP]. Secondly, as (21a) shows, TCs permit long-distance dependencies across multiple clauses, provided that no intervening category occupies an intermediate [Spec, CP] position, as *why* is assumed to in (21b).

(21) a. A guy like John is hard [to imagine [any woman believing [she could marry]]]

b. ?? A guy like John is hard [to imagine [any woman wondering [why she would agree to marry]]]

Finally, TCs license parasitic gaps (Chomsky 1982, Montalbetti et al. 1982). Only if TCs involve application of some variety of *wh*-movement is the asymmetry between the grammaticality of parasitic gaps in TCs and in raising constructions explained:[5]

(22) (?) Lloyd-Webber musicals$_i$ are easy [Op$_i$ to condemn t$_i$ [without even watching e_i]]

(23) * Lloyd-Webber musicals$_i$ are likely [to be condemned t$_i$ [without anyone even watching e_i]]

The Chomsky 1977 approach raises a new theoretical objection, however, in particular violating (standard versions of) θ-theory. As observed by Brody (1993) and Wilder (1991), an analysis whereby the TC subject does not receive a θ-role from the *tough*-predicate must explain how a single θ-role assigned by the embedded verb is apparently "shared" between two arguments: the null operator in the infinitival and the TC subject.

A reviewer suggests that the θ-role problem in TCs is not obviously worse than that of finding a θ-role for the subject in the following kinds of predications:

(24) a. John is a policeman

b. The thing is that you're wrong

However, the "problem" with TCs is in fact quite different: a predicate within the sentence naturally provides a θ-role for the TC subject (and indeed needs to discharge its θ-role, for which the TC can be the recipient). The question is what the mechanism for assigning it could be. Rezac (2004) provides an update to the Chomsky 1977 analyis. Treating TCs within a broader analysis of a range of constructions, he suggests that "[a]ll non-thematic DPs are interpreted by predication: DPs in derived A-positions,

heads of relative clauses, DPs linked to null operators in *tough*-movement constructions, etc." (Rezac 2004, 151–2). He argues that the TC subject is base-generated in Spec TP, receiving its θ-role by a predication mechanism derived by the Minimalist operation Agree. Rezac's solution unifies *tough*-movement with copy raising, yet the two constructions impose different constraints on their subjects. As Rezac shows, a *there* expletive cannot be a TC subject, while it can be a copy raising subject:

(25) a. % There looks like there's gonna be a riot.
b. % There seem like there are problems. (Potsdam and Runner 2001)

(26) a. * There is hard to believe [to have been a crime committed] (Chomsky 1981)
b. * There is hard to believe [PRO to have seen] (Rezac 2004)

Rezac accounts for this by suggesting that linking *there* to a null operator—*pro*, following Browning (1987)—is impossible due to the definiteness restriction on *there*, plus its inability to identify *pro*. Yet on the assumption that the TC subject must receive a θ-role from the embedded clause verb, the ungrammaticality of expletive *there* TC subjects in TCs can be straightforwardly explained as a θ-Criterion violation: the verb in the embedded clause must assign a θ-role associated with its object, and *there* is incapable of receiving it. Further, as a reviewer higlights, quantified DPs are problematic for a copy raising analysis of TCs, given that these are impossible as the subject of a copy raising construction, but not as the TC subject:

(27) * Everybody seems like he's here.

(28) Everybody is hard to reach.

In response to the θ-role problem, Chomsky (1981) proposes a quite ingenious workaround whereby a single θ-role is transmitted from the null operator to the TC subject. Briefly, the analysis follows the approach of Nanni (1978) in assuming that the *easy to please* portion of the derivation is a complex adjective without internal structure. For Chomsky, the derivation involves structural reanalysis ('flattening') of the *easy to please* portion, resulting in the A′-trace being assigned the status of an A-trace, a configuration in which θ-role transmission to the TC subject is possible in the Government and Binding framework. Given that the approach to movement based on traces has by now been largely abandoned in the Minimalist framework, it is difficult to see how this approach could be updated in current assumptions. Also, empirical arguments against it abound.

Levine (1984a,b) argues that strings such as *easy to please* cannot be reanalyzed as a single lexical item in light of several environments in which the components of the putative lexical item are not string-adjacent. Assuming that movement into and out of lexical items is banned, *easy to please* cannot simply be an adjective with no internal structure at the stage of the derivation where *wh*-movement and right-node raising operations apply:

(29) How easy is John to please?

(30) Mary is much more difficult than Sandy to please. (Levine 1984a)

In 4.2 we will also encounter further empirical evidence from reconstruction effects against analyses (including Chomsky 1977 and Chomsky 1981) which base-generate the TC subject in matrix subject position.

Chomsky's (1981) analysis sows the seeds for a composite A-movement and A′-movement analysis of TM. Revisiting the raising accounts by Postal (1971), Postal and Ross (1971), Rosenbaum (1967), Brody (1993) suggests that TCs are derived by an initial application of A′-movement, followed by A-movement of the same category. Brody proposes that the category that is to become the TC subject enters the derivation in the embedded object position, and at a later stage of derivation, moves to [Spec, CP] of the embedded clause. Finally, in the matrix clause, the displaced embedded object is moved again from the embedded [Spec, CP] to matrix [Spec, TP]:

(31) John$_i$ is easy [$_{\text{CP}}$ t_i [$_{\text{TP}}$ PRO to please t_i]]

There remain, however, serious theoretical objections. The Case mismatch encountered by the A-movement analysis is unresolved, since the TC subject must escape accusative case-assignment in its base position in order that it can be assigned nominative case in the matrix clause; it is unclear how this could be plausibly explained. Moreover, just as for the A-movement analysis, locality constraints on movement appear to be violated: movement into an A′-position followed by subsequent A-movement is typically banned as an Improper Movement configuration.[6] Brody (1993:9) reformulates the principle of Improper Movement, stipulating that this variety of movement is permitted in the case where "the lower A-position [embedded object position] is potentially an R-expression and the $\bar{\text{A}}$-position [[Spec, CP] of the infinitival clause] is licensed to contain an operator."

Hornstein (2001) extends Brody's analysis, within a particular version of the Minimalist model. Hornstein suggests that the object of the infinitival clause, by virtue of a

feature [WH] appended to it, moves into [Spec, CP]. From there, it moves "sideward" (Hornstein 1999, Nunes 2001) into a θ-position inside the matrix AP. Regardless of whether movement into θ-positions should be permitted (on the assumptions adopted in section 3.2, it is not) in section 2 we concluded that the TC subject is not the recipient of a θ-role from the *tough*-predicate. From this perspective, Hornstein's modifications to Brody's (1993) analysis are unnecessary for my purposes here. The problems with Brody's analysis therefore remain—unless, that is, the mechanism by which [WH] is appended to the TC subject is articulated further. If the [WH] feature is not simply a feature of the TC subject but a head which projects a larger structure in which the TC subject is a separate constituent, then the two analyses differ considerably. (I am grateful to Norbert Hornstein (p.c.) for pointing out to me that this is, indeed, his intention.)

(32) $[_{XP}$ WH $[_{DP}$ TC subject]]

Schematically, this introduces the possibility of (32), so it may be that two different constituents undergo two separate movements: an A′-movement in the infinitival clause and an A-movement into the TC subject position. Potentially, the Improper Movement violation can be avoided. Hornstein thus sketches an analysis that offers a new take on the A-A′-A-movement approach, which I explore, develop, and formalize further under somewhat different theoretical assumptions below.

3.2 Minimalist Assumptions

Let us now couch the central problems facing TM within the terms of a Minimalist model based on the *Derivation by Phase* framework (Chomsky 2000, 2001, 2004). In this framework, two crucial departures from previous P&P approaches concern the status of agreement and locality. The grammar provides an Agree operation in order to eliminate from the derivation syntactic features that are uninterpretable at LF. Any feature that lacks a value (prefixed *u*, e.g. [*u*ϕ]) is uninterpretable at LF, and so must be erased from the derivation before the portion of the derivation containing it is sent by the Transfer operation to the semantic interpretive component.[7] An uninterpretable feature acts as a probe, seeking a matching valued interpretable feature (a goal) within a local c-command domain. Feature-matching results in the application of Agree between the two categories that bear these features, serving to value the uninterpretable feature. Interpretation by the interfaces is carried out incrementally, in "phases." Upon completion of each phase, commonly—yet not uncontroversially—assumed to equate to every CP and transitive *v*P,

the syntactic material within the phase is transferred to the interfaces and rendered inactive to any further narrow-syntactic operations. The exception is the syntactic material at the edge of each phase, that is, the phase head (C, *v*) and its specifiers ([Spec, CP], [Spec, *v*P]). These positions remain accessible to the immediately higher phase (the *Phase Impenetrability Condition*, PIC). Upon completion of any given phase, then, all categories bearing an uninterpretable feature must either have entered into an Agree operation capable of checking that feature, or must occupy a phase-edge position, which remains (at least potentially) accessible to a probe in the immediately higher phase.

We can now summarize the central problems facing TM in current theoretical terms. First, while the thematic structure of *tough*-predicates leads us towards a raising-based explanation, we must explain why [*u*Case] on the embedded object (to become the TC subject) is not checked in situ by Agree with transitive *v* in the infinitival clause. Yet even if a solution to this problem can be found, given the phase-based architecture of the computational system, we require an explanation for why the unchecked [*u*Case] feature on the TC subject does not crash the derivation at any of the intermediate phase levels between the embedded object position and matrix [Spec, TP]. The only explanation available is that it is due to successive edge-to-edge movement between the embedded object and matrix subject positions that the TC subject's unchecked [*u*Case] escapes Spell-out at each phase. This phase-based explanation has an added advantage that it now allows us to envisage an explanation for the problem that the apparent A-movement exhibits empirical characteristics more consistent with an A′-movement analysis, since only A′-movement (and not A-movement) can target successive phase-edges. While this lays the foundations for an analysis of TM, the motivation for the embedded object's A′-movement is still thus far unexplained, as is the requirement that its [*u*Case] not be checked in situ. I propose a single explanation for these two problems, namely the internal syntax of null operators.

4 Null Operators as "Smugglers"

4.1 Complex null operators

I present below an analysis of the derivation of TCs that instantiates a variety of movement configuration recently termed "smuggling" by Collins (2005a,b), like Hornstein (2001), based on a rethinking of the null operator. The null operator structure I propose is inspired by—but in fact, entirely independent of—Kayne's (2002) derivational

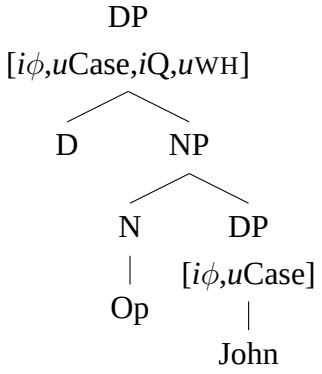
account of binding theory. Kayne, broadly adopting the assumptions of the Minimalist framework as outlined in Chomsky 1995, 2000, 2001, yet building on the view of movement and control developed in Hornstein 1999, 2001, argues that a pronoun or anaphor enters the derivation embedded within the same "complex" DP as its antecedent, as in (33).

(33) $[_{DP}\ [_{DP}$ John$]\ [_{D}$ him(self)$]]$

This complex DP consisting of an antecedent and its pronominal "double" is assigned a single θ-role upon merger with a predicate, yet at a later stage in the derivation the two components of this complex DP separate: the antecedent component (*John*) sideward-moves to another θ-position and is assigned a separate θ-role accordingly. Kayne is tentative concerning the internal structure of the antecedent-pronoun complex and the syntactic mechanisms that operate therein, and concedes that such an analysis is entirely dependent on permitting movement into θ-positions. While I do not adopt Kayne's proposal for pronouns and their antecedents, nor his theoretical assumptions, certain aspects of Kayne's account are adaptable to an analysis of the null operator in TCs.

I suggest that a null operator is to be identified as a *wh*-phrase with a more complex internal structure than is typically assumed. The D head bears *wh*-features, but the null nominal component of the DP can be considered to be a predicate requiring a single argument. Selection therefore motivates the merger of a DP with the null nominal, as in (34).[8, 9]

(34)



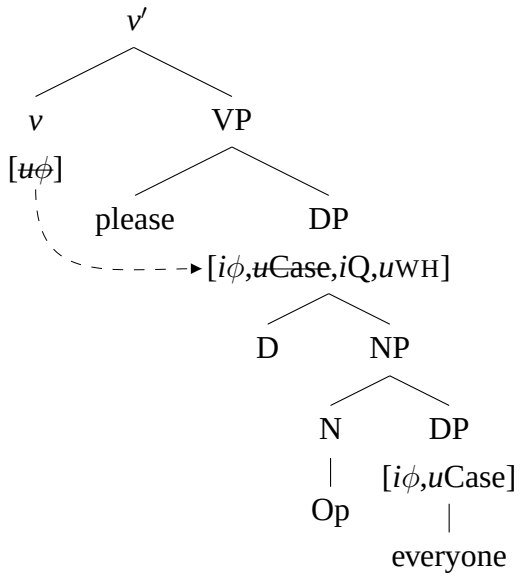
In order for a DP-internal DP (like *John* in (34)) to get its [*u*Case] checked in English, there seems to have to be some morphologically marked functional head: either *of* (as in *pictures of John*), or the possessive D *'s* (as in *John's pictures*). As there is no morphologically overt functional element within the complex null operator, the [*u*Case] feature of the DP-internal argument of the null operator cannot be valued within the DP.

This internal structure of the complex null operator is claimed to overcome all of the fundamental problems associated with previous analyses of TM. To illustrate this, I outline the derivation of a simple TC such as (35).

(35) Everyone is tough for us to please.

At the start of the derivation, once the complex null operator is derived (along the lines of (34)), it merges with V as the object of *please*. The patient θ-role from *please* is assigned to the whole complex DP. The VP now derived is merged with *v*, and the complex null operator enters into ϕ-feature agreement with *v*, [*u*ϕ] on *v* being the relevant probe.

(36)

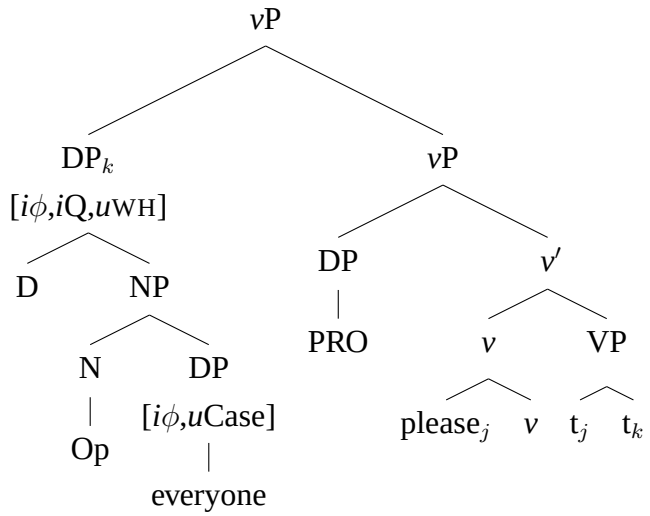


As a reflex of ϕ-feature agreement, the Case-assigning head *v* checks [*u*Case] on the complex null operator. However, the complex null operator's [*u*WH] remains unchecked. The survival of this remaining uninterpretable feature has the consequence that [*i*Q] on the null operator remains active. It is also important that [*u*Case] on *everyone* remains unchecked, as *everyone* has not yet undergone ϕ-feature agreement with a Case-assigning head. Recall that [*u*Case] is an illegal object at the interfaces, and must therefore either be checked within the current *v*P phase or reach the phase-edge ([Spec, *v*P]) where it can escape Transfer to the interfaces.

After the usual V-to-*v* movement, the external argument of *please*, PRO, merges in [Spec, *v*P]. The phase is not yet complete, however, since *wh*-elements bearing the [*i*Q,*u*WH] feature set are typically required to move in English, as [*u*WH] cannot be checked in situ. As required by the PIC, movement must be successive-cyclic through each phase-edge, and is permitted to target the outer [Spec, *v*P] position by virtue of an

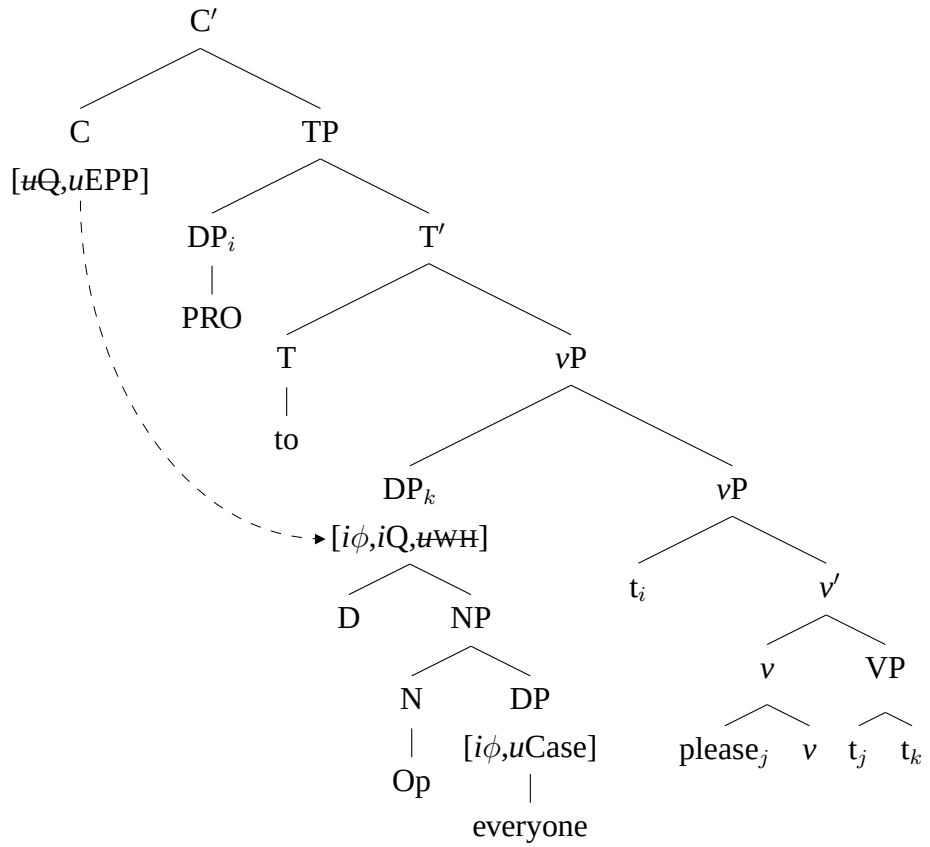
optional [*u*EPP] on *v*. Crucially, this movement of the complex operator, with *everyone* pied-piped, also has the consequence of allowing [*u*Case] on *everyone* to escape being transferred to the interfaces with the rest of the phase. The null operator therefore serves to "smuggle" *everyone*, embedded within it, into the phase-edge:

(37)



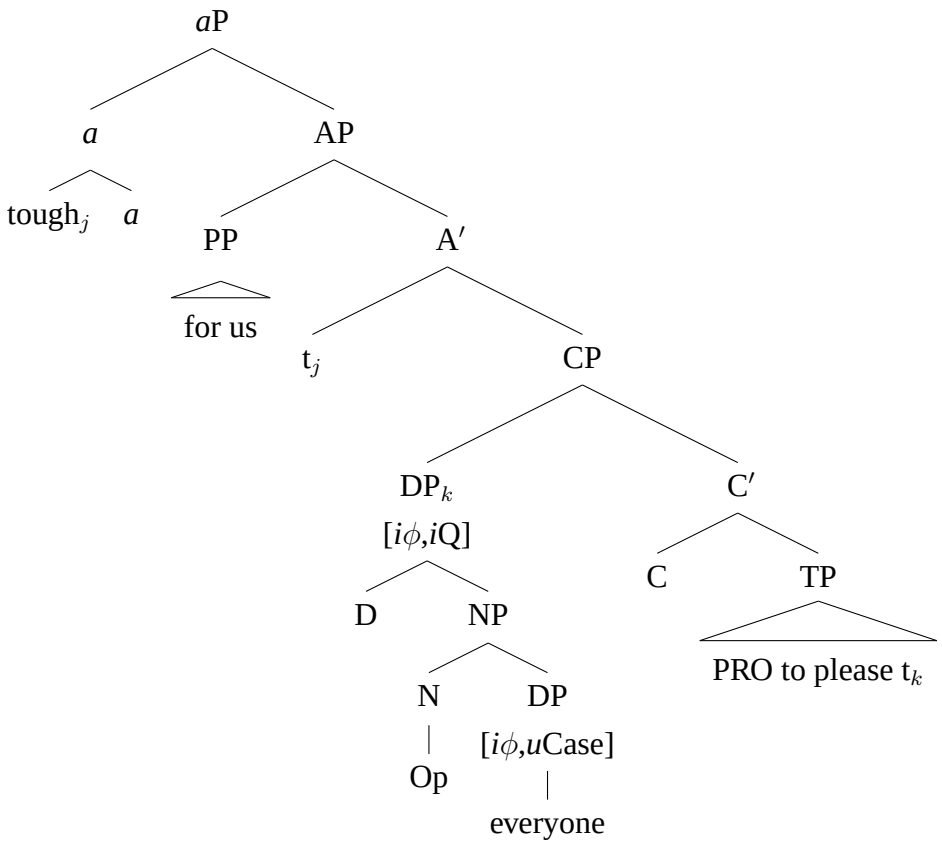
The *v*P phase terminates upon *wh*-movement of the null operator into the outer [Spec, *v*P]. All of the remaining uninterpretable features in *v*P are in the phase-edge, as required since the domain of the *v*P phase (VP) is now inaccessible to further operations, by the PIC. The derivation proceeds as in (38). PRO moves into [Spec, TP] of the infinitival clause, and C merges with TP. It is assumed that this C bears [*u*Q], which is checked in the probe-goal agreement configuration with [*i*Q] on the complex null operator in the left-edge of the *v*P phase. [*u*WH] on the complex null operator is checked as a reflex of this operation, rendering the remaining interpretable features on the null operator inactive:

(38)



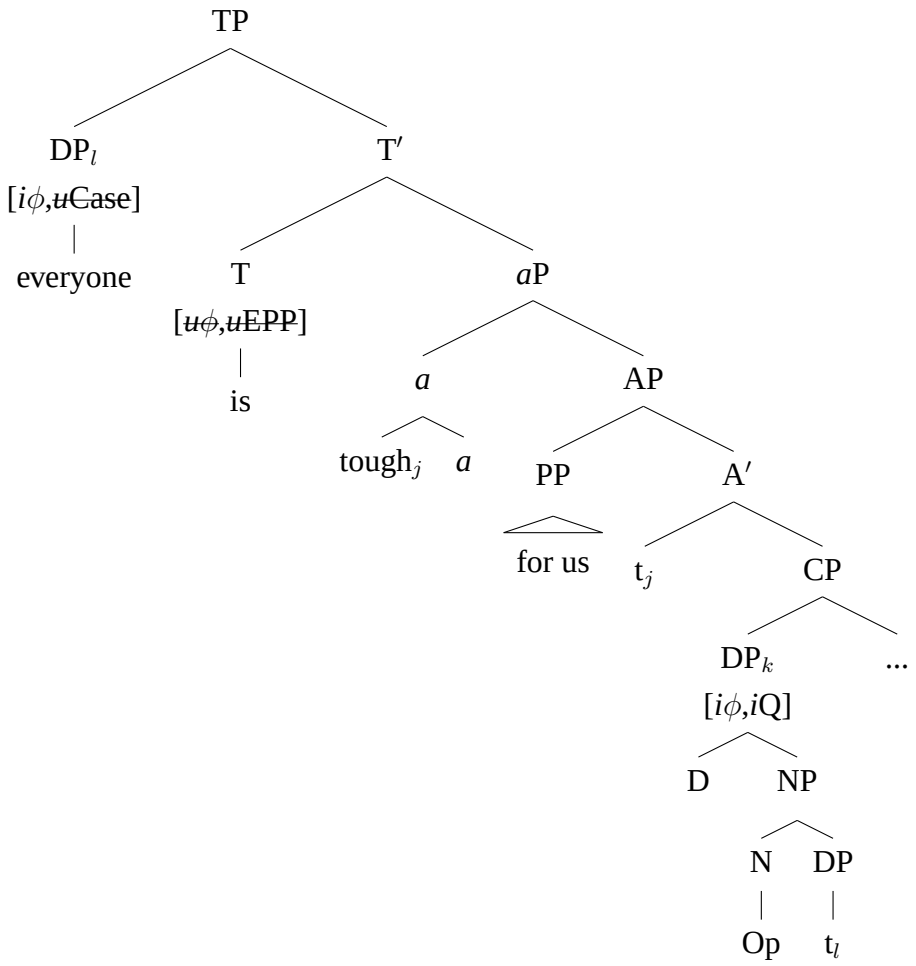
[*u*EPP] on C then drives movement of the complex null operator into the phase-edge position [Spec, CP], as is usual for *wh*-movement in English. Although all of the features on the operator head are checked (and its interpretable features therefore inactivated), the movement of the complex operator into the CP-edge again allows the unchecked [*u*Case] on *everyone* to escape being transferred to the interfaces at the CP phase, which would otherwise crash the derivation. The CP phase complete, the derivation proceeds into the matrix clause.

(39)



T now merges with *a*P, and bearing [*u*ϕ], probes for [*i*ϕ]. As a reflex of ϕ-agreement, a nominative case value is assigned to the goal, which moves to [Spec, TP] to satisfy [*u*EPP]. The only [*i*ϕ] set remaining active in the derivation is that on *everyone* inside the complex null operator. Provided that locality conditions can be satisfied by Agree between T and *everyone*, [*u*ϕ] and [*u*EPP] on T are checked, as is [*u*Case] on *everyone*. Standardly, I assume the phasal projections to be *v*P and CP, those which are considered to be "propositional" by Chomsky (2000, 2001). I assume that since *a*P projects no specifier, like passive and unaccusative *v*Ps for example, it is not a phase. Consequently, CP is the closest phase boundary to the probing T, and by the PIC the DP *everyone* in the CP-edge is within its probing domain, and thus is sufficiently close to enter into agreement.[10] Thus, as is required, all of the uninterpretable features remaining in the derivation are checked at the TP projection, and the terminal phase of the derivation converges:

(40)



Analyses of quite separate phenomena along similar lines have also been proposed independently by Collins (2005a,b).[11] As noted above, Collins has coined the term "smuggling" for any variety of movement which exploits an initial movement within a larger constituent in order to circumvent a locality violation (e.g. PIC or the Minimal Link Condition, MLC). As in the proposed analysis, Collins employs smugglers to move a subject into a position in which it can be successfully probed by T. For Collins (2005b), the subject of a passive in English is smuggled out of its *v*P by movement within a larger constituent (a Participial Phrase, the complement of *v*), into the specifier of VoiceP, from where it is probed by matrix T, and raises into subject position. For raising constructions, though the derivation is more complex (involving remnant movement to derive the correct surface order) Collins (2005a) proposes that the subject is once again moved within the VP containing it, into [Spec, *v*P] of the raising verb. Evidently, the proposed analysis of TCs employs a variety of movement also proposed recently for other A-movements where locality constraints might otherwise expected to block the movement. Further theoretical implications are explored in section 4.3.

4.2 Empirical Predictions

While the aim of this analysis is primarily to offer a viable solution to a long standing theoretical puzzle, its empirical predictions should not be overlooked. Rezac (2004, 188), presenting a view of *tough*-movement as copy raising (see section 3.1), claims "[t]he subject must be base-generated somewhere above the adjectival predicate, because it fails to reconstruct. This is actually a claim that has been insufficiently investigated, and I cannot do it full justice here." The evidence we see in this section argues against this position, showing that the TC subject displays precisely the sort of behavior that would be expected under the analysis presented in section 4.1 In particular, I present evidence from reconstruction that the TC subject has moved from the embedded clause, and stress that only a combined A-A′-A-movement analysis such as the one proposed above (but also those of Brody 1993 and Hornstein 2001) can explain interactions with binding and scope.

Contra Rezac (2004), reconstruction possibilities with binding in fact favor an A-A′-A-movement over an approach whereby the TC subject is base-generated in matrix [Spec, TP]. The binding behavior of the TC subject indicates that at some stage of the derivation, it must occupy a position within the embedded infinitival clause.

(41) Pictures of himself$_i$ are hard for every photographer$_i$ to ignore.

Assuming, following initial insights of Belletti and Rizzi (1988), that anaphors must be c-commanded by their antecedent at (at least) some stage of the derivation (Epstein et al. 1998, Lebeaux 1998, Saito 2003, Hicks 2006), the TC subject must be c-commanded by *every photographer* before movement into matrix [Spec, TP].It appears that the TC subject must have moved from a position at least as low as the embedded [Spec, CP] in order for it to be bound by the experiencer. Picture-noun reflexives in the sort of environment in (41) are often suspected of not being true reflexives and so not subject to a requirement for local binding during the derivation (e.g. Pollard and Sag 1992, 1994, Reinhart and Reuland 1993; see Hicks 2006 for detailed discussion). However, it is less controversial that bound variable pronouns must also be c-commanded by their binder (perhaps by reconstruction at LF). Sportiche (2002) also offers an argument from variable binding that the TC subject must be capable of reconstructing below the experiencer:

(42) Pictures of his$_i$ friends are hard for every photographer$_i$ to sell.

(Sportiche 2002)

A reviewer notes that if variable binding is available via reconstruction in (42), it should also be in cases such as (43), contrary to fact:

(43) His$_{*i}$ friends are easy for every photographer$_i$ to shoot.

The solution to this problem lies in the mechanism involved in reconstruction. Chomsky's (1995, 326) observation that A-movement fails to reconstruct (see also Lasnik 1999 in particular) appears to hold for scopal reconstruction. As noted by Postal (1974): in the raising construction (44), for example, the raised matrix subject *nobody* can only take wide (surface) scope.[12]

(44) Nobody is certain to pass the test. (Postal 1974)
= Nobody is such that he/she is certain to pass the test ($\neg >$ *certain*)
$\neq$ It is certain that nobody will pass the test (**certain* $> \neg$)

Interestingly, Postal also observes the absence of scope reconstruction in TCs. In the non-TC (45a), *few girls* may take either wide or narrow scope, while in the TC (45b), only the surface scope (wide scope) reading is available.

(45) a. It would be difficult for Jim to talk to few girls. (Postal 1974)
= Few girls are such that Jim would have difficulty talking to them (*few* $>$ *difficult*)
= Jim would have difficulty in only talking to few girls (*difficult* $>$ *few*)

b. Few girls would be difficult for Jim to talk to. (Postal 1974)
= Few girls are such that Jim would have difficulty talking to them (*few* $>$ *difficult*)
$\neq$ Jim would have difficulty in only talking to few girls (**difficult* $>$ *few*)

We may capture all the binding and scope reconstruction facts if we assume, following Chomsky (1993) and Boeckx (2001), that an NP constituent of an A-moved DP may optionally reconstruct, whereas the D head cannot. The D head is what determines scope relations, so the absence of reconstruction of D accounts for only the surface scope reading being available in TCs (45b). For binding, though, we may suppose that (41) results in an LF-representation along the lines of (46):

(46) [$_{\text{DP}}$ $\emptyset$ ~~[$_{\text{NP}}$ pictures of himself$_i$]~~] are hard for every photographer$_i$ to ignore $<$ $\emptyset$ pictures of himself$_i$$>$

The head of the raised DP is correctly interpreted in its surface position, while the anaphor contained within NP and interpreted in the reconstructed position, is bound at LF. Furthermore, it also explains the problematic ungrammaticality of the bound variable reading of (43), since *his* cannot reconstruct to a position in which it is bound at LF, since it is not part of the NP constituent. Presumably his occupies the D head position, or [Spec, DP], and so any reconstruction (of NP) will fails to bring the pronoun into the c-command domain of *every photographer*:[13]

(47) * [$_{\text{DP}}$ his$_i$ [$_{\text{NP}}$ ~~friends~~]] are easy for every photographer$_i$ to shoot $<$ ~~his~~ friends$>$

It appears, then, that the evidence from scope reconstruction is in fact entirely compatible with an analysis whereby the TC subject raises from a position in the embedded infinitival clause. The natural way to capture the reconstruction behavior of TC subject with respect to both scope and binding is if it undergoes A-movement into [Spec, TP] from a position c-commanded by the experiencer.

Further empirical evidence for the TC subject deriving from a A-movement out of the embedded clause may come from idiomatic constructions. The behavior of idiom chunks under *tough*-movement is rather unclear, with some idioms working better than others. However, it seems that for each type of idiom, the behavior under *tough*-movement at least mirrors their behavior under passivization. (The following grammaticality judgements are in each case for the idiomatic reading.)

(48) a. They kicked the bucket.
b. * The bucket was kicked (by them).
c. * The bucket was easy/hard (for them) to kick.

(49) a. I'll eat my hat.
b. * My hat will be eaten (by me).
c. * My hat will be easy/hard (for me) to eat.

(50) a. The shit hit the fan.
b. * The fan was hit by the shit.
c. * The fan was easy/hard for the shit to hit.

(51) a. We buried the hatchet.
b. (?) The hatchet was buried (by us).
c. (?) The hatchet was easy/difficult (for us) to bury.

(52) a. We made headway.

b. (?) Headway was made (by us).

c. (?) Headway was easy/difficult (for us) to make.

If *tough*-movement is like passivization in involving movement into [Spec, TP] from a postverbal position, then the parallel behavior of idiom chunks in TCs and passives is at least in principle explainable.

4.3 Theoretical Concerns

This analysis builds on the one outlined by Hornstein (2001), accounting for the intuition that the TC subject appears to have undergone both A′-movement and A-movement, yet crucially, without violating Improper Movement, which is inescapable in the analysis of Brody (1993). The complex null operator containing the smuggled DP (which becomes the TC subject) undergoes movement to an A′-position, while the TC subject itself moves independently of the null operator into an A-position later in the derivation. The Improper Movement violation is circumvented by proposing that separate DPs (one merged within the other) undergo A- and A′-movements. Yet while this approach appears to be more theoretically water-tight than previous P&P approaches with respect to Case, movement, and θ-theoretic concerns, certain issues remain.

4.3.1 Thematic behavior of the complex null operator

One of the principal innovations is that the θ-Criterion violation of analyses based on Lasnik and Fiengo 1974 and Chomsky 1977 is resolved by the TC subject being the recipient of a θ-role not from the *tough*-predicate, nor from the embedded clause predicate, but from the null operator itself. This immediately raises questions about the internal syntax and semantics of the null operator. For clarity of exposition, I will treat two aspects of the interpretive relationship between the null operator and its complement DP in turn: the identity relationship and the θ-role assignments. The complex null operator serves to ensure that the two DP components are treated as one single element, with a single interpretation. Perhaps an appropriate characterization of the null operator is as an element that can only be interpreted as referential when supplied with a referential DP argument: the operator then inherits the reference of its argument. A possible parallel in English could be the internal syntax of reflexives, for example. If the structure of reflexives is syntactically analyzable and *self* can be assumed to be a noun (as first argued

by Postal (1966) and assumed in much subsequent research), *self* could be considered a predicate which can only create a referential DP (a reflexive pronoun) if supplied with a referential (pronominal) argument, in a rather similar configuration to the complex null operator. For example, the reflexive DP *myself* contains the pronoun *my*, but there is no interpretive distinction between the pronominal component and the reflexive; they form a semantically inseparable unit.

Let us now turn our attention to the θ-role assignments involved in the complex null operator. Intuitively, it may appear that the null operator should serve to transfer the θ-role it receives onto its argument. We might envisage an analysis somewhat akin to Jaeggli's (1986) proposal for "external" θ-role assignment in passive constructions. Jaeggli suggests that in passives, the preposition *by* does not assign the external θ-role; the verb does (with the passive suffix playing an important role). As Collins (2005b) notes, the particular θ-role assigned to a DP in a *by*-phrase varies with the verb, and is not therefore restricted by the preposition. In (53a), it receives an agent role, but in (53b), an experiencer.

(53) a. The book was written by John.
b. That professor is feared by all students.

If the null operator were to assign a θ-role to its DP complement by some kind of composite θ-assignment with the main verb (or "percolation" of the θ-role to the smuggled DP), we would expect that the only thematic requirements on the TC subject would be those imposed by the main verb. Strikingly, though, it appears that this is not the case. Given this, we really can provide evidence for the null operator head assigning a θ-role to its DP complement, rather than some rather less clear kind of θ-role percolation process. The crucial evidence is a well known but problematic observation that TCs differ from their non-TC counterparts in that the verb in the embedded clause appears to have to be agentive (Postal 1974). Thus (55b) is marginal, while the structurally similar (54b) is fully grammatical:

(54) a. It is difficult to hit this ball.
b. This ball is difficult to hit.

(55) a. It is easy for students to fear famous professors.
b. ?? Famous professors are easy for students to fear.

Given the null operator structure, it may be possible to work towards an explanation for

this generally unexplained empirical property of TCs. I propose that the null operator head is only capable of assigning a theme θ-role to its DP complement. This makes sense, perhaps, since the theme is in many ways the most general of the θ-roles. In (54b), the null operator head assigns a theme θ-role to its DP complement, *this ball*. *This ball* and the DP containing it are interpreted as semantically identical, given the null operator's semantics. *Hit* then assigns a theme θ-role to the complex null operator, which is compatible with the theme θ-role of the DP *this ball*, which is interpreted identically to the larger DP that contains it. The sentence is perfectly grammatical. In (55b), *famous professors* is similarly assigned a theme θ-role by the null operator. However, the different θ-grid of the verb *fear* means that it can only assign to its object a cause θ-role (or similar). From a strictly syntactic perspective, the derivation converges, yet at LF *famous professors* is interpreted as both patient and cause, resulting in a semantic mismatch. It should be clear, then, how the marginal ?? judgement for (55b) is derived. This provides us with empirical evidence to support our original position that the null operator does indeed impose its own a thematic requirement on its DP complement, potentially independently of the θ-role that is assigned to the whole complex by the infinitival verb. Equally, the complex null operator analysis provides a new account for an otherwise unexplained phenomenon, namely the contrast between (54b) and (55b).

4.3.2 i-within-i condition

A further possible objection to the proposed internal structure of the complex null operator is that it apparently violates the i-within-i condition, a filter devised by Chomsky (1981) in order predict the ungrammaticality of the following structural configuration:

(56) *The i-within-i condition*
"*[$_{\gamma}\ldots\delta\ldots$], where γ and δ bear the same index."
(Chomsky 1981:212)

This rules out structures where a DP occurs within a DP with which it is coreferent, which could be argued to be the case for the proposed complex null operator. (56) was initially devised to explain the ungrammaticality of structures such as:

(57) * [$_{\text{DP}}$ The owner$_i$ of [$_{\text{DP}}$ his$_i$ boat]] (Chomsky 1981)

Yet both the empirical and theoretical basis for the i-within-i condition are dubious. First, as a reviewer notes, the ungrammaticality of Chomsky's (57) may be compounded by it

not constituting a complete sentence. Quite plausible and considerably more acceptable sentences can be found which exhibit an identical indexing configuration:

(58) After paying off the mortgage John finally became [$_{DP}$ the owner$_i$ of [$_{DP}$ his$_i$ (own) house]]

Indeed, Chomsky (1981:229) suggests that (56) is perhaps too restrictive, due to evidence from relative clauses which also appears to contradict it.[14]

Even if there is an empirical case to answer in ruling out structures like (57), the i-within-i condition looks a poor solution. From a theoretical perspective, the scope, formulation, and status of the condition have always been rather unclear (see, e.g., Chomsky 1981:229, note 63). On Minimalist assumptions, however, it is fundamentally untenable, the framework having no place either for representational filters of this sort, or for the referential indices required to formalize it. In the absence of any prevailing Minimalist treatment of i-within-i configurations such as (57), and in light of the dubious nature of the i-within-i condition on empirical grounds, I feel it unnecessary to make further efforts here to distance the complex null operator from the i-within-i configuration.[15]

4.3.3 Absence of intervention effects

The proposed account of null operators in TCs raises further challenging questions for the mechanisms of Agree (feeding movement) proposed by Chomsky (2000, 2001), where the MLC is folded into the Agree algorithm. This primarily concerns the relevance of any inactive interpretable matching features intervening between the probe and goal. As demonstrated in (59), at the stage where matrix T probes [$i\phi$] on *everyone* inside the complex null operator, two sets of inactive ϕ-features are present in positions between T and *everyone*.

(59) [$_{TP}$ T$_{[u\phi,u\text{EPP}]}$ [$_{aP}$ tough for us$_{[i\phi]}$[$_{CP}$ [$_{DP}$ D$_{[i\phi]}$[$_{NP}$ Op [$_{DP}$ everyone$_{[i\phi,u\text{Case}]}$]]]...]]]]

The relevant question is clearly whether ϕ-agreement of T with *everyone* is predicted to be blocked as a minimality violation by intervening ϕ-features. Though Chomsky (2001) assumes that inactivated matching features between a probe and goal do indeed induce a minimality violation, the precise role of inactive features in intervention is not entirely clear under the current framework. The absence of any intervention effect caused by the intermediate ϕ-features on the experiencer argument is reminiscent of the "experiencer

paradox" in raising constructions in English, a long-standing problem for the Minimal Link Condition (see Boeckx 2001, Bošković 2002, Chomsky 1995, Collins 2005a, Torrego 2002). In (61), for example, ϕ-agreement is established between matrix T and *John* in the embedded clause across the experiencer, yet the resulting sentence is perfectly acceptable:

(60) John seems to me to be perfect for the job

(61) $[_{\text{TP}}\ \text{T}_{[u\phi,u\text{EPP}]}$ seems to $\text{me}_{[i\phi]}$ $[_{\text{TP}}\ \text{John}_{[i\phi,u\text{Case}]}$ to be perfect for the job]]

Given the observed similarity between *tough*-predicates and raising predicates, we may safely assume that whatever explains the absence of intervention effects caused by the experiencer's ϕ-features in raising constructions also explains the same effect in TCs.[16] However, the consequences of the inactive $[i\phi]$ on the complex operator DP are yet to be explored. Legate (2002) suggests two relevant possibilities: it may be that inactivated ϕ-features simply are invisible to the search algorithm. As it is only features, and not categories whose status is active or inactive, it does not seem inconceivable that these inactive features are simply ignored by the $[u\phi]$ probe, just as seems to be the case with the inactive ϕ-features on the PP experiencer. Alternatively, Legate suggests that ϕ-features on *wh*-phrases may simply be ignored by T, since an A′-moved element is unable to undergo A-movement due to Improper Movement.

4.3.4 Stipulative a circumvention of Improper Movement

A final concern is that, as a reviewer notes, the complex null operator analysis in some ways involves no less stipulative a circumvention of Improper Movement than Brody's (1993) analysis: without ad hoc restriction, the complex null operator raises the possibility of circumventing Improper Movement on a wider scale. In fact, I show in section 5 below how the complex null operator can be invoked in deriving other kinds of construction, but for the moment it is important to show how Improper Movement circumventions are not more widely attested. The DP that merges within the null operator requires its [*u*Case] to be valued, and as such will either need to enter into an Agree relation with an appropriate Case-assigning head (as in TCs), or be a DP that does not have a [*u*Case] feature that needs to be valued (like PRO, as suggested below). However, *tough*-movement involving a complex null operator is only possible given the right matrix predicates, i.e. one with an otherwise unchecked $[u\varphi]$ feature, that is, usually one lacking an external argument. Hence the same kind of structure could be proposed for verbal predicates like *take* (see note 2):

(62) a. It takes over an hour to solve problems like this one.

b. Problems like this one take over an hour to solve.

It is conceivable that we could also find constructions involving null operators where the smuggled DP receives accusative Case as it values [$u\varphi$] of an accusative Case-assigning head. An ambitious and speculative (not to mention controversial) approach would be to suggest that ECM constructions involve this kind of null operator. Unlike standard treatments which assume the ECM complement is TP, suppose it is a full CP, and hence a phase.

(63) You believe us to know everything.

(64) [$_{vP}$ $v_{[u\phi]}$ believe [$_{CP}$ [$_{TP}$ us$_{[i\phi,u\text{Case}]}$ to [$_{vP}$ know everything]]

The subject of the ECM complement clause will thus be inaccessible to the *v* probe which, results in the ECM subject's [*u*Case] remaining unvalued; the derivation could not converge. However, if ECM constructions involve a complex null operator, with *us* embedded inside, the operator would move from [Spec, TP] to [Spec, CP], that is, to the edge of the CP phase. From there, the [$i\varphi$] on *us* would be visible to the *v* probe, and the derivation would converge:

(65) [$_{vP}$ $v_{[u\phi]}$ believe [$_{CP}$ [$_{DP}$ [$_{NP}$ Op [$_{DP}$ us$_{[i\phi,u\text{Case}]}$]]]$_k$ [$_{TP}$ t$_k$ to [$_{vP}$ know everything]]]]

Further details remain in the example derivation, but are reasonably unproblematic. However, since there is an extremely rich literature on this construction, I do not explore this possible application of the complex null operator in any detail here since a more thorough treatment would take us well beyond the present scope.[17] This is simply a tentative speculation which should be indicative of further applications of the complex null operator, if the syntactic conditions in different types of construction are right.

Concluding this section, it seems that while the implications of certain theoretical technicalities remain to be fully addressed pending further development of the framework, any theoretical problems are not on the same scale as those encountered in previous frameworks, in which Holmberg (2000:839) claims TCs were "unexplained and in principle unexplainable."

5 Extension to other COD Constructions

I turn now to other COD constructions, which are well known to share empirical properties with TM. Such constructions include *pretty* constructions, Degree Specifier Clause (DSC) constructions involving *too*/*enough*, purpose clauses, and infinitival relatives:[18]

(66) a. These flowers$_i$ are pretty [Op$_i$ PRO to look at t$_i$]

b. These articles$_i$ are too outdated [Op$_i$ PRO to find t$_i$ useful]

c. I bought this book$_i$ [Op$_i$ PRO to read t$_i$ on the train]

d. Mary bought [some music$_i$ [Op$_i$ PRO to dance to t$_i$]]

The widely accepted analysis of these null operator constructions (NOCs) is due to Chomsky (1977), which we saw was unavailable for TCs in light of θ-theory, in addition to empirical problems. TCs and the other NOCs form a natural class in that they all exhibit common empirical characteristics, some of which are not attested in overt *wh*-movement constructions. Stowell (1986) notes that unlike overt *wh*-movement constructions, null operators cannot originate in any position in a finite clause[19] or in subject and adjunct positions in infinitival clauses. As mentioned in note 5, NOCs also differ from overt *wh*-movement constructions in not exhibiting weak crossover effects:

(67) Gareth$_i$ is too noisy [$_{CP}$ Op$_i$ for his$_i$ neighbors to put up with t$_i$]

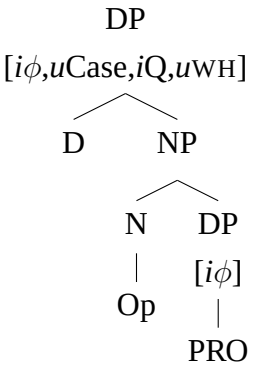
The reader is referred to Lasnik and Fiengo 1974, Cinque 1990 and Grover 1995 for further empirical characteristics common to the various NOCs.

The question remains why TCs should in many ways act like the other NOCs in (66), while also being exceptional in being the only construction to bear any similarity to A-movement constructions. It is typically assumed that the derivation of TCs should involve the sort of null operator found in other NOCs, coupled with some sort of exceptional operations. I claim above that TM motivates a conception of null operators fundamentally different from the standard one, without which TCs cannot receive a theoretically plausible explanation. Once we have motivated the complex null operator structure, it is no more theoretically costly to extend this analysis to the constructions in (66). Such an approach also affords us an intriguing insight into the motivation for null operators. Under the analysis outlined in section 4, the presence of the null operator in TCs essentially permits a DP thematically related to the embedded predicate (albeit indirectly) to move close enough to the matrix clause to allow it to enter into agreement with

matrix T. We can thus view TM as an operation permitting—in effect—long-distance A-movement of an object, made possible by the initial A′-movement. I suggest that in the other NOCs something rather similar motivates the requirement for null operator movement. Rather than long-distance raising, in these cases it is long-distance control (by a category in the matrix clause) that null operator movement permits: in (66a-d), for example, the closest c-commanding DP controls the null operator, similarly to the subject PRO-control configuration.

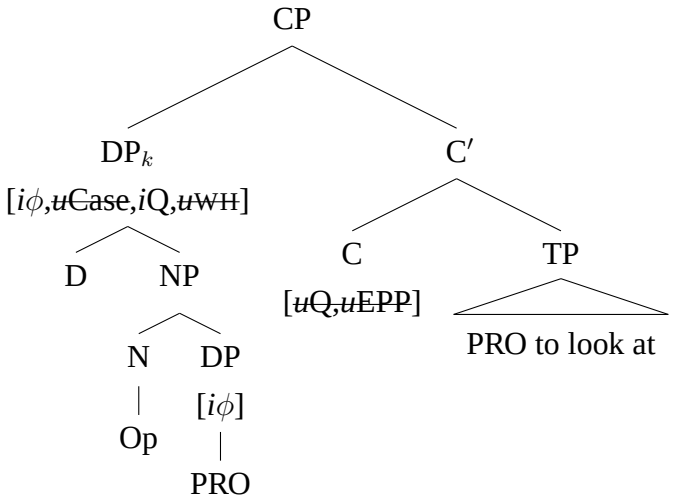
Given the analysis of TCs already presented, I suggest that in the constructions in (66), the argument selected by the null operator is simply PRO:[20]

(68)



Essentially, the derivation of the constructions in (66) is now argued to involve the movement of the complex null operator (68) into [Spec, CP] of the highest embedded clause:

(69)



At this stage, all of the uninterpretable features of the complex null operator are checked, so no further agreement (or movement) of either (68) or the PRO embedded within it is required.[21] Movement of the complex null operator into [Spec, CP] serves to smuggle PRO into a position sufficiently local to a DP in the matrix clause to be controlled by it.

Section 3.1 demonstrated that extending a plausible analysis of other NOCs to TCs has ultimately proved rather fruitless, primarily due to incompatibility with θ-theory. I argue that the methodology must be turned on its head: extending a plausible analysis of TCs to the other NOCs proves to be rather enlightening, allowing a fairly elegant conception of null operators to emerge. Effectively, null operators represent a strategy for establishing the control and raising dependencies—familiarly associated with embedded subjects—with embedded objects: constituents that locality conditions would otherwise render unable to enter into any sort of syntactic relationship with the matrix clause. Null operators simply represent a strategy for establishing control and raising dependencies in environments when they would otherwise be nonlocal, and hence impossible. Essentially, an A′-movement—which typically can circumvent locality constraints imposed by phases—is employed in order to mediate an A-type operation at long-distance. As Svenonius (2004:260) notes, "languages employ different strategies to get features and constituents over the edge."

6 Conclusions

Based on an independently motivated lexical argument structure for *tough*-predicates, the proposed analysis of TCs is argued to be compatible with the full set of core theoretical conditions concerning Case, θ-theory, and movement. The theoretical mysteries surrounding TM are reduced to a single factor: the internal structure of null operators. A null operator is a nominal predicate, introduced by a *wh*-marked null D, taking an argument whose Case feature cannot be checked internally to the DP (at least in TCs; see note 21). Successive-cyclic A′-movement of this complex null operator through each intermediate phase-edge position (driven ultimately by its uninterpretable *wh*-feature) avoids the illegal transfer to the interfaces of the embedded DP's remaining unchecked [*u*Case]. Once the *wh*-movement of the complex null operator phrase terminates, the embedded DP occupies a position probed by the uninterpretable ϕ-features on the matrix T, and is subsequently raised into the TC subject position. In this way, TM's unusual properties of both A-movement and A′-movement receive a natural explanation.

In addition to the proposed analysis for TCs, the complex null operator is shown to offer an analysis for other NOCs, if PRO is assumed to be the argument of the null operator in these constructions. Subsequently, the extension in order to accommodate other NOCs is instructive in working towards a deeper understanding of null operators and their function. TCs and other NOCs reduce to raising and control constructions re-

spectively, the difference being that the initial A′-movement of the complex null operator pied-pipes a DP that is subsequently either raised or controlled. The general motivation for null operators is thus understood: absolute locality conditions cannot be satisfied in an agreement operation between an object DP in an embedded clause and the relevant category in the matrix clause unless this DP is smuggled through successive phase-edges by pied-piping inside a complex null operator. This extension of the complex null operator implicitly challenges the common intuition that the status of TM in the syntactic framework is in some sense "exceptional." However theoretically enigmatic TCs prove to be, their regular production in spontaneous speech indicates that TCs cannot be considered marginal constructions. If, as it appears, the operations involved in *tough*-movement need no longer be considered in any way anomalous, syntactic theory at last has a place for the *tough*-construction.

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Notes

[1]Also commonly termed *tough*-movement constructions, or *easy to please* constructions.

[2]Dalrymple and Holloway King (2000) and Flickinger (1995) suggest that verbs such as *take* (*six months*) and *cost* (*five pounds*) may be considered *tough*-class verbs as they

exhibit properties quite similar to other *tough*-predicates and also occur in constructions apparently equivalent to non-TCs. Pesetsky (1987) also suggests that Psych-verbs may be classed as *tough*-predicates yet as Pesetsky concedes, informants typically judge the relevant sentences as rather marginal:

(i) War$_i$ frightens me$_j$ [PRO$_j$ to think about e_i] (Pesetsky 1987)

The reader is referred to Akatsuka 1979, Chung and Gamon 1996, Flickinger and Nerbonne 1992, where more exhaustive lists of *tough*-predicates are provided.

[3]Note, however, that Lasnik and Fiengo (1974) claim that such *tough*-moved idiom chunks are ungrammatical. Pulman (1993) and others observe that the cases of acceptable idiom chunks as TC subjects are fairly restricted; (14) may be somewhat unusual in this regard, for reasons which are not clear to me. See §4.2 for further details.

[4]The classical debate on *tough*-movement in the generative literature cannot be treated exhaustively within the scope of this paper and may already be familiar to many readers; a more complete history is provided in Hicks (2003), on which much of this article is based.

[5]However, like A-movement and unlike A′-movement, TCs do not give rise to weak crossover effects:

(i) John$_i$ should be easy for [his$_i$ wife] [Op$_i$ [PRO to love t$_i$]] (Lasnik and Stowell 1991)

(ii) John$_i$ seems to [his$_i$ mother] [t$_i$ to lack discipline]

Lasnik and Stowell (1991) demonstrate that a lack of sensitivity to Weak Crossover is in fact exhibited in other COD constructions assumed to involve null operators:

(iii) John$_i$ isn't old enough for us [Op$_i$ [PRO to ask [his$_i$ wife] to give up t$_i$]](Lasnik and Stowell 1991)

It is reasonable then to follow Lasnik and Stowell in concluding that whatever accounts for the immunity to WCO in (5) also accounts for the same characteristic in TCs.

[6]See Bruening (2001) and Svenonius (2004) for theories that capture Improper Movement effects within the Minimalist framework of Chomsky (2000, 2001).

[7]Unvalued features are also uninterpretable at the PF interface. However, features

which enter the derivation unvalued survive at PF, by virtue of receiving a value by the application of Agree during the computational component. While uninterpretable features which receive a value during the computation are interpreted at PF, then, they are not at LF.

[8]Additional movements within the complex DP are of course possible, depending on theory-internal requirements; see section 4.3.

[9]It is also possible to envisage an analysis of null operators closer to Kayne's antecedent-pronoun complex in (33):

(vi) $[_{DP}\ [_{DP}$ John$]\ [_{D}$ Op$]]$

However, difficult theory-internal questions arise, such as the motivation for the merger of *John* in (vi). Moreover, if *John* does not receive a θ-role within the operator DP, the classic problem of the θ-Criterion violation remains, since *John* must eventually target matrix subject position yet cannot collect a θ-role during the course of the derivation.

[10]Though the absolute locality requirement of the PIC is met, it is unclear whether relativized locality requirements (e.g. the Minimal Link Condition) are met. I address this matter in 4.3. A reviewer also notes that if DP is a phase, extraction from the complement position of DP should no be permitted. However, under the assumptions adopted in this paper, DP is not treated as a phase (Chomsky 2000, 2001). Alternatively, if it were to be a phase, *everyone* would presumably be required to move through [Spec, DP] on its way out. While this is not impossible in order to rescue the analysis, the movement would require further motivation. Given that this is not required on the assumptions made in this paper, I do not pursue its technicalities any further.

[11]A similar type of movement has been suggested by Svenonius (2004) in order to derive long A-scrambling in Japanese.

[12]Raised indefinite DPs are a possible counter-example, however, due to May's (1977) observation that raised indefinites are often interpreted with narrow scope.

(i) Someone from New York is likely to win the lottery. $\exists > likely$; $likely > \exists$

This is sometimes used as evidence for reconstruction with A-movement (see, e.g., Barss 1986, Lebeaux 1998, Fox 2000), although Lasnik (1999, 206) suggests attributing the phenomenon to "the meaning of indefinites, rather than the result of a syntactic operation."

[13]This explanation may be further supported by a possible contrast between (43) and a case where the pronoun is not, presumably, in the D position of the TC subject:

(i) Friends of his$_i$ are easy for every photographer$_i$ to shoot.

To my ear, this seems a significant improvement over (43), though perhaps still not fully acceptable.

[14]As the reviewer notes, the possibility of "accidental coreference" in i-within-i configurations may interfere with judgements.

[15]Note, however, that the same objection might be levelled at Kayne's (2002) antecedent-pronoun complex.

[16]A reviewer notes that the analysis predicts that TCs are not possible in Icelandic, given that dative experiencers in Icelandic induce blocking effects in raising constructions, and that in 2.2 we assume that when no overt *for*-phrase occurs, the experiencer is structurally present (Berman and Szamosi 1972, Epstein 1984). The reviewer also points out that the prediction may be borne out, given Thráinsson's (1979, 322, fn.1) observation that "Icelandic lacks a rule like *Tough*-Movement." Though I make no specific claims about TCs cross-linguistically, evidence that seems to point in the right direction is encouraging.

[17]Intriguingly, though, this could provide an account for the observation (which Chomsky (1977) attributes to John Kimball) that ECM subjects cannot be *tough*-moved. As such, the ECM construction would require the putative subject of the ECM complement to be embedded in a complex null operator. After movement of the operator into [Spec, CP] of the ECM complement, the putative ECM subject would have its [*u*Case] valued by *v* in the matrix clause, and hence would be inactive for further movements (e.g. into the matrix [Spec, TP]).

[18]I follow Stowell (1986) in not including finite relatives in this class of NOCs, as they exhibit empirical properties more consistent with overt *wh*-movement constructions. Presumably the same should apply to clefts, for example. Parasitic gap constructions (PGCs) are also omitted from Stowell's analysis of NOCs; see Contreras 1993 for ways in which PGCs differ from other NOCs.

[19]Contra Stowell, I suggest that this requirement appears to constrain not the original position of the null operator, but rather the finiteness of the highest embedded clause (of which the null operator is assumed to move to [Spec, CP]), as (i) appears to be acceptable,

despite the null operator entering the derivation in an embedded finite clause.

(i) Mary is tough for me to believe that John would ever marry. (Kaplan and Bresnan 1982)

As Nanni (1978) notes, speakers vary in their degrees of acceptance of the sort of sentence in (i); Grover (1995) reports that grammaticality judgments for these sentences also vary greatly in the literature. I tend to agree with Kaplan and Bresnan's (1982) grammaticality judgment above, consistent with Calcagno's (1999) claim that there are at least some sentences of this type that are clearly acceptable. Furthermore, if some speakers find these sentences mildly ungrammatical, we might reasonably invoke Jacobson's (1992) observation that the acceptability of movement from more deeply embedded clauses tails off more quickly with TM than with overt *wh*-movement.

[20]As suggested in note 8, for theory-internal reasons it might be assumed that the smuggled DP (here, PRO) must move internally within the complex null operator; this is not crucial for my purposes here.

[21]An obvious theoretical concern in (68) is the Case of PRO. Either PRO must in fact bear no Case feature (as in GB), or, following Chomsky and Lasnik's (1993) account for the distribution of PRO, PRO's Case feature must be assigned a null value internally to the complex null operator. Pending a fully satisfactory account for the feature specification of PRO, I do not deal with this matter here.